Project Fish and Aquatic Invertebrate Resources

Yadkin-Pee Dee Hydroelectric Project No. 2206

Water Resources Working Group
May 7, 2003
Surveys of Existing Resources

- **Reservoirs** (electrofishing and gill netting quarterly sampling, annual cove rotenone, and profundal benthos)
  - Blewett Falls Lake (1999, 2001)

- **Tailwaters** (electrofishing and gill netting quarterly sampling, stream benthos–EPT/BI assessment)
  - Tillery Dam to Blewett Falls Lake (2000, 2002)
  - Blewett Falls Dam to Johnsonville, SC (1999, 2001)

- **Historical surveys** (electrofishing, netting and cove rotenone)
  - Lake Tillery and immediate tailwaters (1992)
  - Blewett Falls Lake and immediate tailwaters (1986 and 1993)
  - Pee Dee River below Blewett Falls (1979)
Surveys of Existing Resources (continued)

- Special surveys
  - Migratory fish surveys (electrofishing, gill netting, and larval fish biweekly sampling)
    - Blewett Falls Dam to Yauhannah, SC (March-June 1998 and 1999)
  - Resident fish reproductive survey (same methods and frequency as listed above)
    - Tillery Dam and Highway 109 Bridge (March-June 2000)
  - Intensive spring assessment for largemouth bass, sunfish, and Carolina redhorse in littoral zone of Blewett Falls Lake (April 2002)
  - Aquatic habitat mapping of Lake Tillery shoreline areas (June-August 2000)
  - American eel exotic nematode parasite study (collaboration with Dr. Mary Moser, NMFS, and Wesley Patrick, ECU)
Lake Tillery Fishery Characteristics

- Lake supports a healthy warmwater fishery.
  - Diverse fish assemblage with 46 taxa recorded from the lake.
  - Largemouth bass, striped bass, black crappie, white perch, sunfish, yellow perch and shad are dominant species.
  - Major sport fish have normal body condition and population structure indices.

- Moderate biological productivity influences fish biomass production.
  - Electrofishing and gill netting total fish catches lower than most upstream Yadkin reservoirs and Blewett Falls Lake.
  - Largemouth bass electrofishing catch rates comparable to other nearby reservoirs.
  - The lake supports a fish population within the expected range for a mesotrophic impoundment.
Pee Dee River below Tillery Hydroelectric Plant

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Pee Dee River Fishery Characteristics

*Reach from Tillery Plant to Blewett Falls Lake*

- Similar taxa richness between immediate tailwaters and mid-reach.
- Smallmouth buffalo was a dominant species in this reach.
- Dominant species in immediate tailwaters were smallmouth buffalo, gizzard shad, longnose gar, and largemouth bass.
- Below Rocky River confluence, dominance shifted to gizzard shad, smallmouth buffalo, carp, threadfin shad, blue catfish, and channel catfish.
- Reproductive activity documented for 17 species—dominant larvae were blueback herring, threadfin shad, gizzard shad, carpsuckers/buffalo, white perch, and yellow perch.
- Striped bass and white bass migratory movements into Tillery tailwaters.
Blewett Falls Fishery Characteristics

- Diverse fish assemblage with 52 taxa present, including rare species of Carolina redhorse and highfin carpsucker.
- Productive fishery due to nutrient enrichment, but large amount of biomass is shad, smallmouth buffalo, and blue catfish.
- Dominant species were gizzard shad, threadfin shad, blue catfish, smallmouth buffalo, channel catfish, largemouth bass, and crappie.
  - Electrofishing and gill netting total fish mean catch ranked third in Yadkin-Pee Dee chain of reservoirs.
- Lake supported reasonable sport fish populations for largemouth bass and crappie, as demonstrated by catch rates, size structure, and body condition.
  - Strong year class of largemouth bass produced in 1999 should sustain fishery.
  - Biomass of largemouth bass was twice of expected value for southeast lake.
  - Spring electrofishing catch rates of largemouth bass were 16-33 fish/hr.
  - Crappie population has large number of quality–sized fish present.
Pee Dee River, NC-SC
Migratory Fish Studies

- Five species documented using Pee Dee reach below Blewett Development:
  - American shad (March-mid-June)
  - Blueback herring (March-April)
  - Hickory shad* (February-March)
  - Striped bass (April-May)
  - American eel (March-June)

- Shortnose sturgeon documented by SCDNR using the reach.

- American shad was most abundant migratory species, ranking in top five most abundant fish in tailwaters.

- Stronger American shad run noted in 1998 vs. 1999 based on catch rates.

- American eel were present below Blewett Plant and smaller numbers were also found in Blewett Falls Lake and river reach below Tillery Plant.
Pee Dee River Characteristics

*Reach below Blewett Plant*

- Diverse fish assemblage with 84 taxa documented in the reach.
  - Greater species richness and electrofishing catch rates in immediate tailwaters.
  - Rare species noted in this reach—shortnose sturgeon, robust redhorse, Carolina redhorse, and highfin carpsucker.
- Nonnative fish were prevalent in this reach—smallmouth buffalo, carp, blue catfish, flathead catfish, channel catfish, and grass carp.
- Fish reproductive activity documented in the reach.
  - Most were resident species.
  - Reproduction of migratory species noted—American shad, blueback herring, hickory shad, and striped bass.
  - Larval densities were greatest in middle to upper reach areas, peak activity in April-May.
Rare Fish Species

- Shortnose sturgeon, Atlantic sturgeon, robust redhorse, Carolina redhorse, and highfin carpsucker recorded from project waters.
  - Shortnose sturgeon not located in Blewett tailwaters during recent surveys.
    - SCDNR has captured and tracked tagged fish.
  - No Atlantic sturgeon were found in Blewett tailwaters, one anecdotal record from 1951.
  - Robust redhorse present in Blewett tailwaters.
    - Small population but some evidence of successful reproduction (Fall Line Zone and Coastal Plain).
    - Ongoing cooperative studies, TWG formed.
  - Carolina redhorse populations located in Blewett Falls and Tillery Reservoirs and Blewett tailwaters.
    - Reservoirs provide holding and rearing habitat for this species.
    - Little River provides Carolina redhorse spawning habitat and harbors an upstream population.
  - Highfin carpsucker recorded from Blewett Falls Lake and Blewett tailwaters.

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Benthic Invertebrate Characteristics

- Lake benthos typical of piedmont reservoirs:
  - Dominated by worms and midges.
  - Higher densities noted in Lake Tillery than Blewett Falls Lake.
  - No discernible statistical differences of benthic invertebrate densities with lake depth.

- Stream invertebrate assessments indicated:
  - Diverse assemblages for both river reaches, particularly below Blewett Plant.
  - Taxa richness and biotic index scores generally increased with distance downstream of power plants.
  - Biotic index scores ranged from Poor to Good-Fair in reach below Tillery Plant.
  - Biotic index scores ranged from Good-Fair to Excellent in reach below Blewett Plant.
Mussel fauna

- Total of 15 mussel taxa documented in project reservoirs and tailwaters.
  - Greater number of taxa located in Blewett tailwaters.
  - Six rare species documented: Roanoke slabshell, Eastern pondmussel, Eastern lampmussel, Creeper, Alewife floater, and yellow lampmussel.
  - Roanoke slabshell and Creeper were found in river reach below Tillery Plant.
  - No Carolina heelsplitters found in surveys.

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